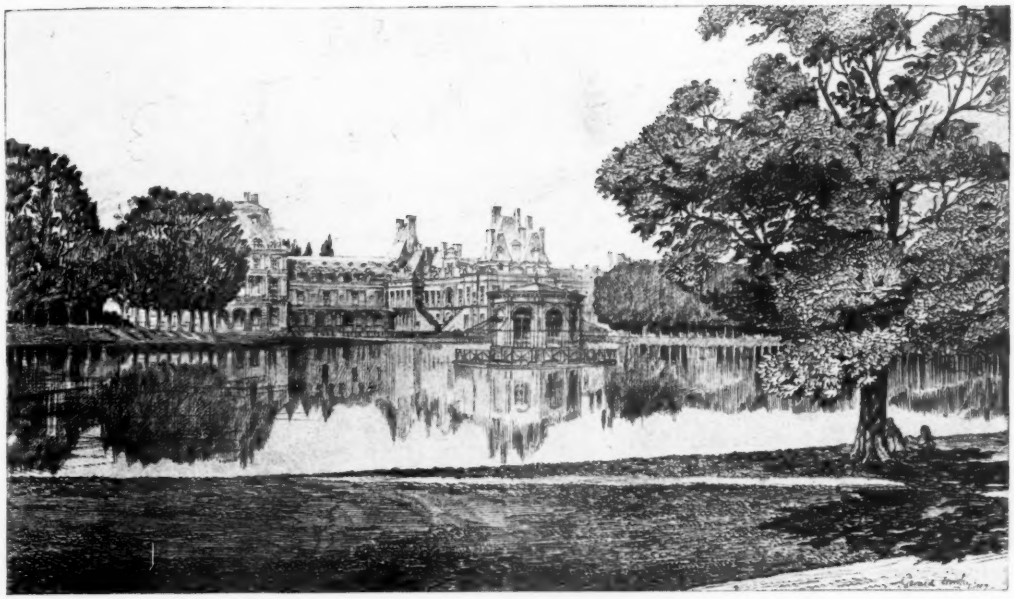


Fontainebleau. Drawn by Gerald C. Horsley.

STYLE IN ARCHITECTURAL DRAUGHTSMANSHIP.

By Stanley D. Adshead [*F.*].

Read before the Liverpool Society of Architects, January 1907.

I.

UNTIL about the time of the 1851 Exhibition, architecture in this country developed with a unity of purpose which has never since been attained; individuality expressed itself within circumscribed lines, and architects designed with a confidence never since felt. Socialistic tendencies, scientific methods, and foreign travel have changed all this, with the result that modern architecture, although occasionally giving us works which are of scholarly interest or striking in their individualism, fails utterly, when regarded as a whole, for want of cohesion and agreement as to general direction.

I think that this view of modern architecture is now pretty generally recognised; but I doubt if many have observed that the same condition obtains with regard to the sister arts of painting and sculpture, and perhaps but few have perceived that similar conditions affect the less important art of architectural draughtsmanship.

It is quite evident that at no period did architecture depend so much for its proper realisation and execution as at the present upon draughtsmanship. Years ago every architect was a master craftsman; to-day he is a scholar. The time was when draughtsmanship held a position of secondary importance; but nowadays, when an exact conception, complete to the minutest detail, has not only to be evolved, but accurately set down in concrete form (before in many cases the architect has even seen the site), draughtsmanship has become an accomplishment of very great importance, and requires to be of a very high order.

This change ought not to have had a bad effect on architecture, but I am afraid that such is the case. Not only is architecture controlled too much by draughtsmanship, in the sense that its effect is insufficiently considered as seen in brick and stone, so to speak, but it undoubtedly suffers through eccentricities in manner and style which unconsciously translate themselves into eccentric architecture.

Still, architecture must necessarily remain dependent on draughtsmanship, and therefore I am inclined to think that one of the surest means of arriving at a more uniform and truly national style of architecture is to be found in the adoption in our recognised educational institutions of a uniform and traditional manner of drawing, such as obtains in France and America.

II.

It appears to me that we have become hopelessly confused in our appropriation of the different methods, manners, and styles which we assume in the representation of our architecture, and it is my particular intention in this Paper to discuss and consider their correct application.

Taking a broad view of architectural draughtsmanship, we notice that it separates itself into two distinct methods. The first, which is scientific, I will designate the *explicit* method; the second, which is æsthetic, the *suggestive* method. Both are at times intimately connected, the latter being in reality a concentration or abstraction of the former.

The explicit method requires for its exposition a clear conception of certain simple attributes of the subject, and mechanical skill in transferring these to paper. Such draughtsmanship can be taught with complete confidence, as it conforms to easily perceivable rules. As examples of the finest drawings that have been made according to this method, I may refer to the measured drawings of the Prix de Rome students. Doubtless many of you have seen reproductions of these in the work by D'Espouy and elsewhere. The skill displayed in the execution of these drawings is amazing.

The suggestive method of drawing demands in its exposition great excellence in taste and an appreciation of the abstract. Its effect appeals direct to the imagination, and, being too subtle for analysis, rules cannot be framed sufficiently complex to compass it. Accomplishment in this method is the hall-mark of the artistic architect, and ability to appreciate its subtleties is the birthright of the artist.

The explicit method is essentially artificial, as opposed to the suggestive, which is natural. I consider that every architectural student should make himself a master of explicit draughtsmanship. This is most essential, and he who is ambitious to become a really accomplished draughtsman should, along with this study, pursue the more serious study of the suggestive method. I am inclined to think that the study of the former, unless accompanied by the separate study of the latter, is apt to cramp the student. Both should be carried on at the same time, but should be regarded from entirely different standpoints. Studies in suggestive draughtsmanship should not be confined simply to architecture, but should include in their curriculum the drawing of the figure and landscape composition.

I have said that it is impossible to teach this method of drawing with confidence. I mean that it will not conform to recognised rules and regulations, and a dogmatic criticism is apt to be misapplied. At the same time much can be done by example. It is a case where example is distinctly preferable to precept. Architectural schools should possess, as examples for the students, originals or copies of the best works that have been executed according to the suggestive method.

Whilst under this head I wish to express my entire disapproval of the pure outline

TREVI FOUNTAIN, ROME: FROM THE DRAWING BY PAUL BLONDEL, "PRIX DE ROME" STUDENT.

drawing as a means of expression. Let us have drawings executed according to the explicit method by all means, but let these be rendered. Outline drawings should only be used as working drawings, as documents in a contract, and when cheap reproduction is absolutely essential.

III.

I now come to manner and style. Correctly speaking, explicit draughtsmanship is too mechanical to be affected by either manner or style; in practice, however, it is impossible to produce a drawing which is absolutely explicit according to the strict definition of the term. In this method, therefore, we are bound to admit something of style; but I wish you to understand that in general I use the terms "manner" and "style" in reference to suggestive draughtsmanship only, and in particular to drawings executed according to the perspective system.

All draughtsmanship is primarily controlled in its execution by manner. Manner is closely allied to style, being, in fact, the treatment wherein expression is given to style. Manner may be broad or confined in its treatment, and free or cramped in its technique. Breadth affords opportunity for the expression of style.

As an instance of confined manner, take the kind of draughtsmanship which will not admit of a ruled line, or of that which is all ruled and will not admit of the hand-directed line. In this connection let us remember that the hand-directed line is unquestionably very sympathetic; it is also very expressive, but in the delineation of classic architecture I cannot advise its entire use. Here precision and vigour are qualities of the first importance, and for their due expression the use of the ruled line is imperative.

Then there is the case where it is considered to be a false mode of expression to make use of anything so conventional as a line at all; shade is finished against shade, and colour against colour. Here there is a straining after photographic correctness, and an evident intention to be realistic, which is not good. All draughtsmanship is conventional, and must ever remain so; the sooner we admit this fact the better. By ignoring the value of line one of the most useful devices in all draughtsmanship is disregarded and effect is lost. A very careful study of the works of Canaletto has convinced me that in drawing architecture we should make a free use of line.

Then there is the case in pen-work where cross-hatching is entirely forbidden, in wash-work where body colour is not allowed, &c.

In conclusion I would point out that it is much easier to obtain perfection in a confined manner than where the manner is broad; but perfection obtained in a broad manner is undoubtedly the greater accomplishment.

IV.

In draughtsmanship style is that indescribable attribute which approximates to the soul. It is the personal note; it supplies the human interest. It is closely allied to temperament, and evokes sympathy or antipathy. Without style all is cold and insipid; the drawing which evinces but little evidence of style may interest but can never delight.

Style in draughtsmanship gives us a new view of the subject, regenerated, reanimated, reflecting the character and disposition of the exponent. Hence out of variety in human disposition we come to have difference in style.

We all possess style of our own, but in our draughtsmanship we express that initial style which is our own, not so much in the manner of our attitude towards the subject (we are none of us sufficiently original for this) as in the way in which we make use of and adopt

set styles in draughtsmanship which have been already formulated by our predecessors. We form our style on the styles of our predecessors; we see things as others more original than ourselves have shown us how to see them. It is the use we make of the styles of our predecessors which determines our own style: its originality simply depends upon the excellence of the taste displayed in selecting and combining, and upon the scope of the selection. The style which is our own tends to be intellectual or capricious, and if we are ambitious to do the best work it is our business to see that it is in the first place intellectual.

When intellectual, the subject is approached with an observation trained to note all its characteristics with a judgment so well balanced as to be able to discriminate such as are most fitting its noblest conception, and with a knowledge of the already formulated styles in draughtsmanship so complete as to be able to choose out and adopt such as are best suited to express these characteristics.

When capricious the subject is approached in an attitude predisposed to observe only certain characteristics, and a style in draughtsmanship is adopted suited to the eccentric disposition of the exponent rather than to the noblest characteristics of the subject.

The first is reasonable as opposed to the second, which is instinctive.

Essential to the expression of style is consistency in manner. It requires great experience in draughtsmanship fully to express style, but with persistent practice it will ultimately assert itself, and will follow as the direct result of a capability to make use of the devices of manner and technique. To some this power will come early, to others not until late in their career. I would not advise a student to be in too great a hurry to formulate style, though its due expression is essential to all good draughtsmanship. If formulated too early it will be deficient in excellences, which with a wider range of vision and greater choice in selection would most assuredly have crept in.

I now propose to direct your consideration to the names of those outstanding geniuses, whom we may regard as being originators of style, and whose style is distinctly intellectual.

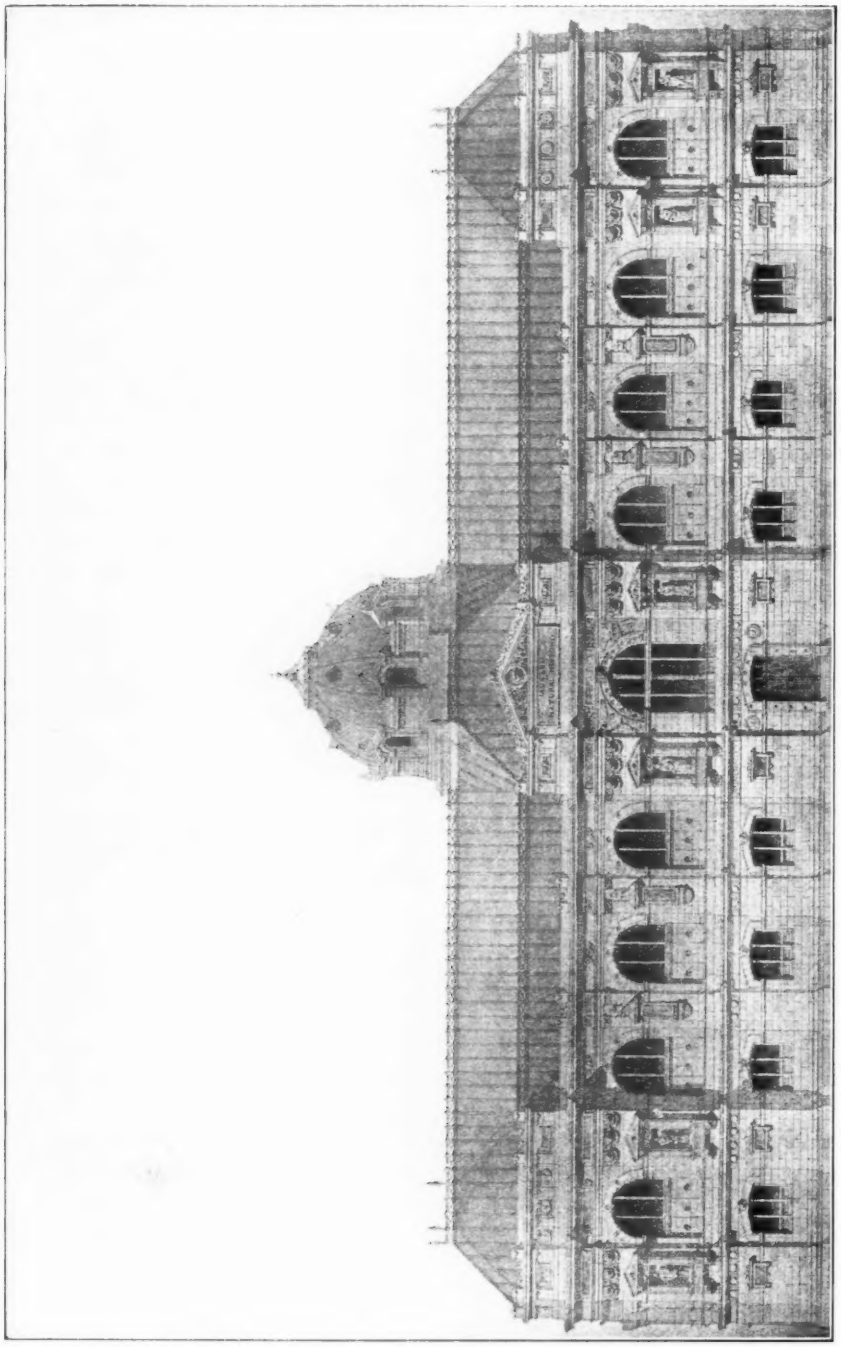
First in order of importance I place Piranesi. His work always evinced a lofty intelligence, and in contemplating the serene grandeur with which it is imbued one's attention is never distracted by a petty intrusion. The interest he aroused in his rich accumulation of detail, in his awe-inspiring effects and picturesque compositions, was so well managed as always to enhance rather than detract from the initial delight in the nobility of his general conception.

Canaletto, I think, comes next. He was, in the first place, a subject painter, but his love of architecture and his ability to bring his architecture in touch with the ordinary incidents of every-day life are deserving of our closest study. His manner was his own, and no draughtsman has surpassed him in the magic use of line.

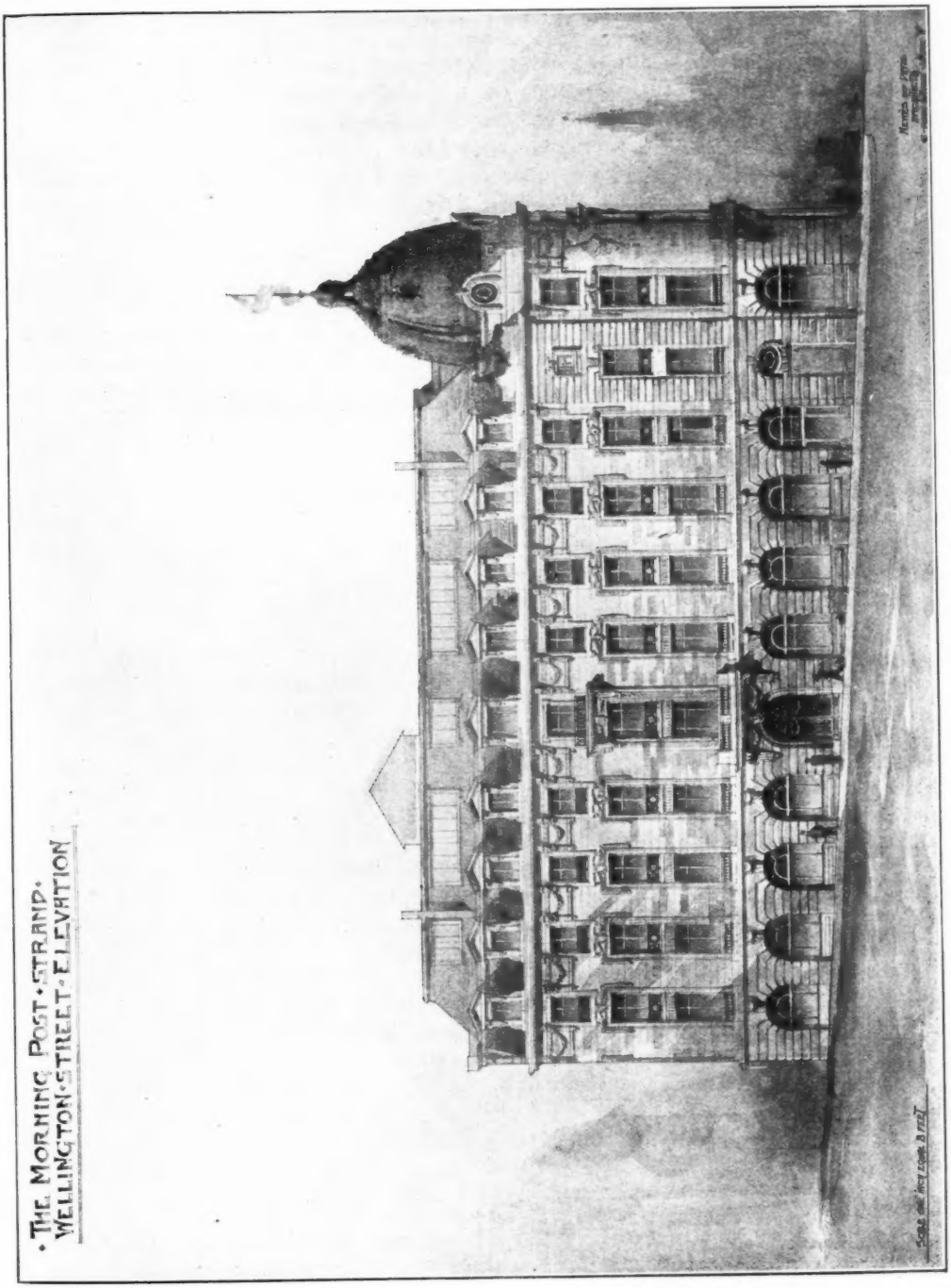
Turner, though best known as a landscape painter, was early associated with architecture; and so powerful has been his influence on draughtsmanship of every description that we must not omit to mention his name in this connection. His freedom of manner was extraordinary, and his abstract architecture, often nebulous and visionary, is set in a splendour of surroundings so magnificent, and is bathed in a light so ethereal, as to be absolutely captivating in its poetic conception.

Amongst many others who were, however, inclined to be more capricious in their style I choose out the following:—

Francesco Gaudi, for picturesque composition, and, coming nearer home, Robert Adam and Clerisseau, who worked together in Rome after Piranesi, and formulated a style which had a very great influence on English draughtsmanship of the nineteenth century. Gandy, Smirke,



DESIGN FOR A MUSEUM OF NATURAL HISTORY: FROM A DRAWING BY R. PHENÉ SPIERS.



OFFICES OF THE "MORNING POST"; FROM A DRAWING BY W. DAVIS IN THE FRENCH STYLE

and Cockerell owe much to these men ; their manner was not great, but their style was always refined.

Augustus Pugin, Samuel Prout, and David Roberts were architectural painters rather than draughtsmen, but their work had a great influence on the architectural draughtsmen of their time. From amongst such I pick out for your especial consideration Joseph Nash and Louis Haghe. Their style was very similar. Louis Haghe was a master of picturesque composition ; but as a colourist he was poor, or I should have placed him first. In Joseph Nash, however, we have one of the most brilliant all-round architectural draughtsmen that this country has ever produced ; for dexterity of manner and for brilliancy and sparkle his work has never been surpassed.

Among pen draughtsmen I place Vierge easily first : his manner is unequalled for subtle suggestion.

Among modern draughtsmen whose style is, I consider, very pronounced and deserving your first consideration, I may mention William Flockhart for directness and for the absolute freedom and breadth of his technique ; E. A. Rickards for his appreciation of subtle forms and for the wonderful freedom of his line ; Ernest George for his picturesque compositions ; Sir Charles Nicholson for tone and colour ; and F. W. Simon for his appreciation of the refinements of classic architecture.

I have now given you a list of those who I consider deserve to rank as the greatest exponents of style in architectural draughtsmanship ; and I have commented upon their work that you may understand what I mean by that initial style which is entirely personal. There are also the set styles which we adopt, and which correspond to particular types of temperament. Let me warn you to be cautious in the use of such styles, for it is your choice in their adoption which makes that style, which is your own, either intelligent or capricious ; unless adopted with intelligence, such styles may not only be quite out of place, but will possibly prove absolutely ridiculous. From among the more pronounced of such set styles in draughtsmanship I pick out the following as examples :—

The Terrible style, the Picturesque style, the Quaint style.

In the Terrible style the draughtsman is ever seeking to inspire awe. Figures, balustrades, and doorways are reduced in scale, whilst towers and domes rend the air and pierce the clouds. Piranesi adopted this style in his works, known as the Prison Series, in excellent taste.

In the Picturesque style there is ever an effort to produce what I term stage effects. The oriel window, the ivy-clad turret, the shady portal, the broken column, and the chimney corner are all examples of features of the greatest interest. I quote Francesco Gaudi and Samuel Prout as masters of this style.

In the Quaint style we get a simple interest in all sorts of oddities, such as gargoyles, rain-water pipes, ridge tiles, hinges, handles, finials, and jointings. All attention is paid to their due expression. German draughtsmanship is particularly inclined to favour this style.

In explicit draughtsmanship, historical events and the national temperament are responsible for the expression of some style. In this kind of draughtsmanship there are, however, only two styles which are sufficiently pronounced to deserve serious consideration. The characteristic feature of the first is refinement, and it is best known as the French style, or had it not been for recent aberrations I would prefer to have called it the Academic style. The characteristic feature of the second is strength, and it will best be recognised as the thick-line or competition style.

In the manner of the French or Academic style the lines are drawn with light ink and practically as thin as possible, and thus the greatest amount of information is guaranteed and

refinement ensured; practically the edges of all facets are expressed by thin light lines, which are clear and true, and do not cross or run into one another. Nothing is suggested, everything is shown exactly. When the drawing is complete, it is more or less elaborately rendered for effect: this is done with similar exactitude, the edges of all the shadows being scientifically found, the depth of the reflections and varying strengths of the shadows in their receding planes being carefully considered. For a technical description of how such drawings are made I cannot do better than refer you to a work on drawing by Mr. Phenè Spiers, the late accomplished drawing master at the Royal Academy.

Mr. Spiers's influence upon architectural draughtsmanship during the latter part of last century was inestimable, and had it not been for the reactionary influence of the Gothic revivalists at the Academy he would undoubtedly have preserved to us a truly national style of explicit draughtsmanship which would have gone far to prevent many unworthy digressions in modern architecture. Now it is this style of draughtsmanship for which I strongly advocate a revival in this country. It was in use to the exclusion of all others at the Royal Academy until some thirty or forty years ago, and it is at present in use in the École des Beaux-Arts in France, and universally in America. It is refining in its influence, because its expression necessitates a capability to search into detail, and no style in explicit draughtsmanship is so rich and telling in its effect as is this style when highly rendered, the manner of producing effect by shadow and reflection being capable of infinite resource. I go so far as to say that the representation of good architecture can only be done justice to in this style, because a characteristic attribute of good architecture is refined detail.

It may be contended that for ordinary and competition purposes this style of draughtsmanship demands too great an expenditure of energy and time. In reply to this I would say that it is impossible to make explicit drawings with rapidity in any style; when explicit draughtsmanship is hurried, we may be pretty sure either that the style is poor or that the architecture is such as is not worth drawing under any circumstances.

Let us now consider this very prevalent style of draughtsmanship which I have designated the thick-line or competition style. I am indebted to Mr. Spiers for the information that the thick line was first recommended to the students at the Royal Academy in the year 1866 by the late William Burges. I understand that he recommended the thick line on the ground that its use obviated the necessity of showing very much detail.

This may be a specimen of Gothic revivalist doctrine, and this quite possibly may have been the origin of the use of the thick line in modern practice; but an argument of this kind would never have given thick-line drawing much impetus had there not been other and more potent causes at work; my own opinion is that thick-line drawing in this country owes its development almost entirely to the stress of competitions, which have stirred draughtsmen to undertake herculean feats, and who possibly not possessing sufficient confidence in themselves to rely for success upon a display of grace and refinement, or possibly not having sufficient confidence in their assessor to discriminate between refinement and impotence, decided to captivate him with a simple display of brute force: an appeal which I regret to have to admit has undoubtedly helped to ensure success in many cases. One often hears in reference to competition drawings, "Ink it in with a thick line, or the assessor will never see it." Do assessors give their awards on questions of ink? Let us hope that this is not so, and let us hope, as I think we may, that assessors are not to be captivated merely with a display of good black ink.

The fact of the matter is, the adoption of this style is simply useful as a cloak to the would-be designer who lacks a knowledge of detail and a sense of refinement. In this style drawings cannot be rendered with any sort of success. I have seen cases where shade has been

added, but the net result is a nasty soapy sort of effect which is altogether outside the pale of artistic expression.

There are other styles in explicit draughtsmanship, but they are all more or less deformed; in particular I may mention the flashy style. The draughtsman who works in this style rules in patches of jointing which give a flashy sort of effect; if the joints are to be ruled in at all they should be ruled in throughout, and if the design is well balanced the effect will of necessity be well balanced also.

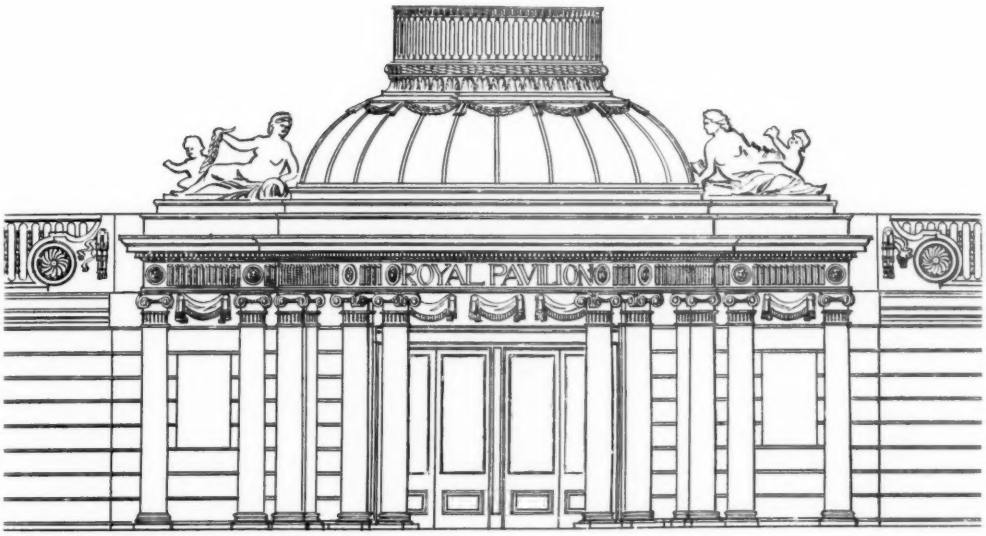
There is also the style which relies for its effect upon a tricky use of the notched T square, that which relies for its effect upon the use of different densities of ink, and others which

ENTRANCE TO THE ROYAL VICTORIA PAVILION, RAMSGATE: FROM A PHOTOGRAPH.

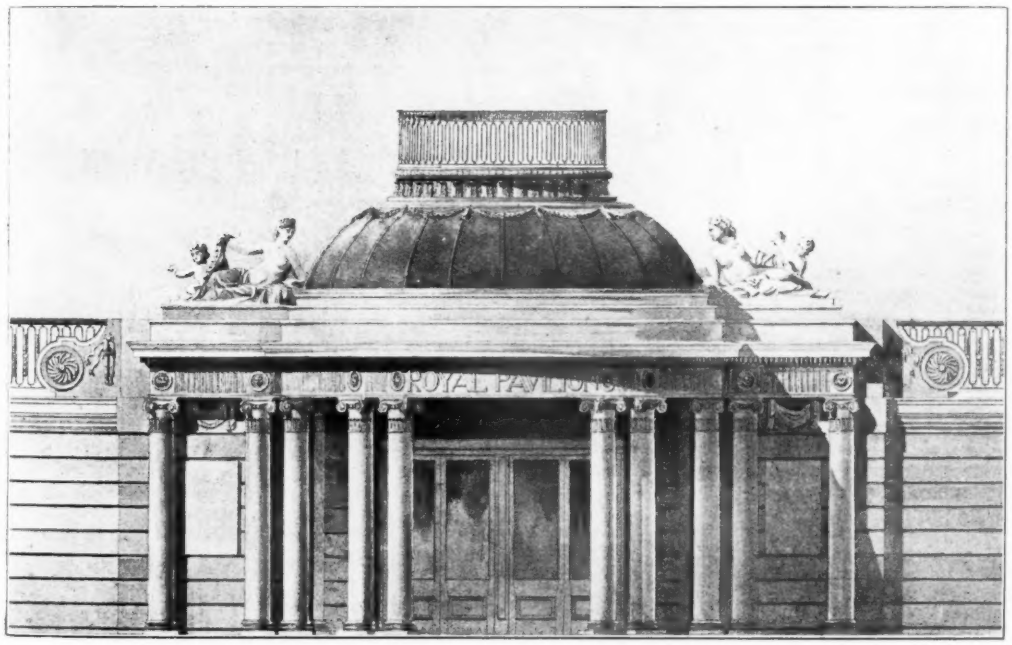
exhibit all manner of freaks resulting from the use of broken lines, back lines, crossed lines, dots, spots, and splashes. All such, however, even when displayed to the greatest advantage, are merely pretty. Perhaps I err in describing them as styles in explicit draughtsmanship; essentially they are very poor examples of styles in the suggestive method.

V.

It only remains for me now to make a few remarks on the influence of architectural draughtsmanship on architecture.



ENTRANCE TO THE RAMSGATE PAVILION: FROM A DRAWING BY THE AUTHOR IN A "THICK LINE" OR "COMPETITION" STYLE.



THE SAME, FROM A DRAWING BY THE AUTHOR IN THE "FRENCH" OR "ACADEMIC" STYLE.

I have advocated the use of the French or Academic style in explicit draughtsmanship, and I have said that the most prevalent style is the thick-line style. I will now show you that this thick-line or competition style, and others more or less deformed, are entirely responsible for a poverty in detail, a loss in refinement, and a foolish groping after the fantastic in modern architecture. Compare any typical modern municipal building or Carnegie library with such examples of old work as we get in the Banqueting Hall at Whitehall, the Bank of England, or your own St. George's Hall; measure the depth of the fillets, count the variety of the enrichments and compare the delicacy of their carvings, and you will be convinced.

I ascribe this degeneracy largely to our coarse manner of drawing. But, apart from coarseness and poverty in detail, modern architecture has in its varying styles assumed all sorts of fantastic shapes and grotesque absurdities, such as blocks, where in old work we would have had refined and well-drawn consoles; interpenetrations of mouldings, panels, and blocks, and suchlike cut and jumpy freaks of cleverness which outvie a Chinese puzzle in intricacy—all perfectly meaningless and entirely resulting from the use of an eccentric method in explicit draughtsmanship which admits of an unrestrained use of crossed and broken lines. And last, but not least, I notice the entire absence of the fluted column. The flutes of a column are said to be very difficult to draw.

In conclusion I repeat that a good national style of architecture will most assuredly result from the general adoption of a refined manner and noble style in draughtsmanship.

DISCUSSION ON THE REPORT OF THE JOINT REINFORCED CONCRETE COMMITTEE.*

Mr. Thomas E. Collcutt, *President*, in the Chair.

THE Provisional Report of the Joint Committee on Reinforced Concrete, advance copies of which were sent out to members with the Journal of 27th April, was duly presented by the Chairman of the Committee, Sir Henry Tanner, I.S.O. [*F.*], at the General Meeting last Monday. Sir Henry, in the course of some prefatory remarks, referred to the formation and constitution of the Committee, and briefly sketched their work and aims. Alluding to the lack of any authoritative pronouncement in this country on the rules to be observed in reinforced-concrete construction, he said that this had in many ways prevented the employment of reinforced concrete, such employment being practically prohibited for buildings under the ordinary building regulations. It was only such bodies as railway and dock companies, who were not bound by these regulations, who had been able to avail themselves of so economical and space-saving a method of construction. Other countries had been more lenient, and in consequence were far in advance of this, both as to general knowledge of the material and skill in its use. The Committee had formed three sub-committees for the consideration of (1) Fire Resistance, (2) Materials, (3) Formulæ. These sub-committees had considered an enormous mass of literature, including the regulations in force in other countries. Messrs. Cubitt had placed at the disposal of the Committee seventeen beams, plain and reinforced, for testing to destruction. These were the only tests made. Available records of all kinds of accurately tabulated tests had largely removed the material from the unknown; and the Committee felt that what was required was rather a reasoned theory based on recorded experiments than further experiments of their own. The aim of the Committee had been to produce a good working guide, the laying down of necessary conditions, and settling safe rules for a proper disposition of the parts. The difficulty had been to determine the merits of rival systems; but the Report and Rules would enable the architect to form an accurate judgment for himself if he had the requisite knowledge, or with the aid of a consulting engineer if he preferred. The Rules proposed were by no means revolutionary; the same principles were being adopted abroad, but with some variation of detail.

Sir Henry concluded by moving the adoption of the Report, and that copies, with explanatory letters, be sent to the Local Government Board and the London County Council.

Mr. John Slater, B.A.Lond. [*F.*], said he had much pleasure in seconding the adoption of the Report. They, as architects, were bound to be interested in any new invention which dealt with methods of construction, and it was most desirable that any such inventions should be submitted to the deliberation and discussion of an independent and unbiased body of men. It was desirable not only in their own interests, but in the interests of their clients, and particularly in the interests of the inventors themselves. Architects must naturally be somewhat shy of recommending to their clients anything of an empirical nature, because, of course, they must not risk failure. Their clients under ordinary circumstances were averse from making experiments of their own on the ground of expense, and therefore were inclined to fight shy of new inventions. But by this disinclination to run any risks they might lose a great deal if the new invention was of such a kind as would suit their requirements. And especially was it desirable in the interests of the inventors themselves. Inventors were inclined to be both a jealous and a sanguine class of persons. Many no doubt knew the old story of the stage carpenter who invented a method of producing thunder on the stage which was extremely naturalistic. He heard one day that in a rival establishment they were also creating very realistic thunderstorms; so he went to the rival theatre, and when the thunder occurred he could not contain himself, but jumped up from his seat and called out in a loud voice, "I say, that is my thunder; that is my thunder!" He was inclined to think that a great many inventors, when someone else discovered or invented something which had a close similarity to their own bantling, were inclined to cry out, "My thunder, my thunder!" Inventors were also, quite naturally and rightly, a sanguine class of people. Theirs had been the brain from which had emanated the new idea; theirs had been the trouble of investigating and experimenting and bringing down from the slippery heights of theory to the solid domain of hard fact and practicability and usefulness the new thing they had discovered. He made no complaint of that; it was human nature. But there was a danger that the people who had investigated a new departure, a new invention, would not be able to control the well-

* Sir Henry Tanner's remarks will be printed in full in the next number of the Journal, together with the Report as finally revised, and Appendices by Professor Unwin and Mr. William Dunn. A further Appendix by Mr. Dunn, giving Examples of the Method of Calculation, has been added to the Report, and will be included in the next issue.

nigh uncontrollable tendency to magnify the good points of the new invention, and to minimise those slight symptoms which might tend to show a defect, because the inventors were so certain they were right. He felt confident, therefore, that the publication of the Report of the Committee would do a great deal to encourage and to advance this novel method of building in reinforced concrete. A great deal of the Report was of a very abstruse nature; the calculations and that kind of thing were matters that most of them were unable to go into for themselves; but they could, at any rate, endorse the recommendation of the Committee that the system of by-laws, whether of the London County Council or of other local bodies, ought to be so modified and altered as to allow of the use of this new material as extensively as possible. Most people who had seen this new invention would agree with what the Committee said as to the necessity for extremely careful supervision in the manipulation of this new material. In the last number of the JOURNAL there was a quotation from an article by Colonel Winn, in which he said that a careless man with a shovel may defeat their most elaborate calculations; and it was absolutely necessary that with this new method of construction constant supervision should be provided. Doubtless there were present some who desired to give expression to their views and possibly to ask some questions on the subject, so that he would not detain them any longer; but before he sat down he should like to do what Sir Henry Tanner in his capacity as Chairman of the Committee was precluded from doing, viz. to propose that a hearty vote of thanks be given to the Committee for the investigations they had made and the trouble they had taken in preparing their Report.

Mr. E. FIANDER ETCHELLS, Fellow of the Physical Society, said he should like to support the vote of thanks. He knew that the amount of work which was visible on that Report was not one-tenth, or one-twentieth, or one-fiftieth of what the Committee had done; and, more than that, he would congratulate the Royal Institute of British Architects on being the pioneers among the learned societies and institutions of the country in laying down rules for the guidance of their members as to construction in reinforced concrete. The Report would be exceedingly useful, and one of its chief advantages was that it would admit all patents on an equal footing, and let each patent be tried—except patent ways of calculation! The recommendations of the Committee would prevent that. He was delighted to see that the Committee had made such a consistent effort to get throughout a scientific method of calculation, and when in the present state of the subject that had not been possible, they had gone as near to the ideal as they could. He also congratulated them on the care with which the general provisions had been laid out. For instance, on page 1, half way down the page, it said: "If the metal skeleton is properly coated with cement." That was exceedingly necessary; for the Committee of the Structural Association of San Francisco had recommended that the use of cinder concrete should be forbidden. It was found on examination of cinder-concrete floors in a number of buildings that the corrosion was so extensive as to seriously endanger the safety; and while the Report before them said that the metal skeleton should be properly coated, the question now arose whether in every case such procedure was practicable; for in the practical execution of such work there were thousands of intricate bends and joints and connections. He would therefore ask the Committee to add one more paragraph giving the benefit of their experience and showing how this coating could be everywhere properly and efficiently done. There was, however, a greater objection to coke-breeze concrete than its corrosion. On page 237 of the 3rd edition of Marsh and Dunn's classic it was stated: "For concrete of coke-breeze and furnace ashes the resistance to compression may be taken as one-third of that of broken stone, and it may be even less." Then with regard to page 5, line 7, there was no definition of the accidental load given until the foot of page 6 was reached, and that definition was not absolutely clear. In any case, "imposed load" or "superimposed load" would be less ambiguous than the term chosen; for it scarcely seemed fitting that the load for which the building was designed and specially calculated to carry should be called the accidental load. Whatever "accidental" may have meant in Newton's time, to-day its obvious and predominant meaning is something which happens, especially anything occurring unexpectedly, or without known or assignable cause, or something happening contrary to our desires. "Superimposed" was a more suitable word for modern use, and did not require a special footnote to explain it. On page 6, section 3, provision was made for the common assumption that all floors may not be loaded to their fullest capacity at the same time. It was noted that the suggestions made by the R.I.B.A. for steel-framed buildings gave reductions of 5 per cent. per floor, while the recommendations for reinforced concrete buildings gave reductions of 10 per cent. per floor. In a six-story building this meant a difference of about 14 per cent. There should not be two standards on this one point. The 5 per cent. reductions appeared to be based on the New York code. He would be glad if the Committee would inform them as to who was authority for the 10 per cent. reductions. Furthermore, although the assumption might be true for a big hotel or an office block, it was obvious that in a warehouse the growth of the business, without increase of floor space, might mean that loads would be piled high. Also the fluctuation of prices or the condition of the market might be such that at certain seasons the goods would be held back and the warehouse

crammed. It might be that at a riverside warehouse several ships would discharge their cargo and fill the warehouse with bags of cement, rice, sugar, or paper. For these reasons he submitted that the aforementioned clause should not apply to buildings of the warehouse class. On page 8 the diagram was not in concord with the equations below it. The difference in the slope of the diagonal lines was very misleading till it was perceived that it was the value of t which was given in the diagram and not $\frac{t}{m}$. He suggested that another diagram be added, or that that one be altered so that the diagonal lines would have the same slope in order to show the similar triangles implied by the equations thereunder. On page 9, last equation, a misprint occurred. For d_1^2 should be read d^2. On page 10, three parts of the way down, equation for kd would appear to have a simpler form than that given. On page 12, halfway down, there was a mistake in the equation for Z; Z should $=2n\mathrm{A}h$, not $\frac{1}{2}n\mathrm{A}h$. On page 12, three parts of the way down, Case I., it was not made sufficiently clear that the rods were equidistant from the neutral axis. The word "symmetrical" by itself was not enough. The rods might be arranged in a circle and still be symmetrical with regard to the neutral axis. On page 13, Case III., equation for Z, there was a mistake in the second numerical coefficient: it should read $\frac{1}{4}$, not $\frac{1}{16}$. This might be ascertained either by direct integration from first principles or by reference to the equation for value of moment of inertia in example 3 on page 19. On page 19, line 5, he suggested that this should be added to so that it would read: "For a circular section with all rods equidistant from the neutral axis." On page 19, end of line 10, there was an error: instead of $\mathrm{A}_c+14\mathrm{A}_t$ it should be A_c+14a.

Mr. H. D. Searles-Wood [*F.*], Hon. Secretary of the Committee, said that with regard to Mr. Etchells's criticisms on the formulæ perhaps Professor Unwin had better answer them in writing, because he was entirely responsible for them, and had got out the proofs for the Committee. Mr. Wells, who had promised to be present that evening, but had been unfortunately prevented from coming at the last moment, wished to make some communications with regard to the value of sheer in concrete that would be found of value in the Report, and in order to prove his proposition he had got Messrs. Earle, of Hull, to make him some special blocks which he had submitted to Messrs. Kirkaldy for the purpose of working out his views, and he had promised to communicate the result of the experiments to the Institute Journal.

Mr. William Dunn [*F.*], who was called on by the President, said he should like to reply to at least one part of Mr. Etchells's criticism—viz. the part in which he dealt with cinder concrete and the Report of the Structural Committee of San Francisco. If his memory served him right the San Francisco Structural Committee appointed a sub-committee of two to investigate the subject. That sub-committee of two found that where rust existed it was because the concrete was extremely porous: coke-breeze concrete, they knew, was apt to be porous, because it absorbed a great deal of water. The sub-committee did not, he understood, controvert the conclusions of the very exhaustive experiments Professor Norton had made at the Fire Insurance Station in Boston in 1902 and 1903. He had made a very exhaustive series of experiments there, exposing iron embedded in concrete to all kinds of influences which in the course of three weeks were sufficient to eat through ordinary bars of iron; and he had come to the conclusion that cinder concrete was equally effective with ordinary stone or gravel concrete, or very nearly so, in protecting iron against rust. He found that the sulphur in cinder concrete did not deleteriously affect it because its influence was neutralised by the alkaline nature of the cement. He found that the main factor, of course, was what the Committee pointed out, that the iron should be thoroughly coated with cement mortar, and, next, that the concrete itself should be free from voids, which was best obtained by making the concrete fairly wet and thoroughly tamping it. The materials sub-committee had this subject before them, and argued it out very fully; indeed, he thought they pretty well exhausted the subject, and they came to the conclusion to make this recommendation with full knowledge of the facts as known at the present time. Another point Mr. Etchells touched upon was the question of the diagrams. He (the speaker) happened to be on the Mathematical Committee with Professor Unwin, and he was not able to pronounce right away an opinion upon the mathematics which Mr. Etchells had got up, but he thought they had reduced the expression kd to its simplest form. The other question was the question of the diagram which he (the speaker) had drawn under Professor Unwin's direction. It might improve that diagram if the straight line in the upper part of it, the strong line, were drawn in a continuous line; it would show more simply the angles upon which the reasoning was based, and that was a correction which he thought the Committee might perhaps make. To those who were familiar with reinforced-concrete mathematics it was quite plain, but it might not be so to others. Mr. Etchells had asked about the question of reduction for floor loads. Mr. Etchells would see, if he looked, that there was no reduction made except for buildings containing more than three floors, and from such knowledge as he (the speaker) had of loading buildings, even iron warehouses, he did not remember ever to have seen four floors fully loaded; indeed it was almost impossible to get them fully loaded. Although he had not got the most recent New York by-laws with him he thought this 10 per cent. was in conformity with

the recommendation in those by-laws. The Committee at the time their report was made had before them a number of by-laws, those of New York, the French Government Rules, the Austrian Government Rules, the Prussian, the Swiss, the German Engineers' Association Rules, and various others, and the Committee considered all those rules; and he frankly owned that, so far as he was concerned as a member of the Committee, he was not aware that the Institute had made other regulations which were not in consonance with this. He might be wrong, and it was putting reinforced concrete at an advantage of course; but taking the thing in itself he thought it was a perfectly reasonable recommendation to make. That, of course, the Institute could express its opinion upon. The other matters Mr. Etchells had touched upon were matters of mathematics upon which one would hesitate to express an opinion without full consideration; but no doubt if Mr. Etchells would put them before the Committee his views would be fully considered.

Major E. M. Paul, R.E., who was one of the representatives of the War Office on the Committee, said he had hoped that Colonel Mayne, who was a much more able exponent than himself, would have been present to represent the War Department. On their behalf he would like to be allowed to endorse what Mr. Etchells had said in congratulating the Royal Institute of British Architects on bringing this matter so prominently forward, and on being the first in the field to do so. The War Department would undoubtedly utilise reinforced concrete in future, and there appeared to be a great field for military engineers in applying it to fortification work. How far it could be applied to fortifications they were not at present able to say. Experiments would doubtless be made, and, in conjunction with the Royal Artillery, who alone could give the requisite information as to the effect of projectiles against reinforced structures, much useful information would be got together. He thought he was right in saying that in Jamaica a great deal of reinforced concrete was likely to be introduced in rebuilding Kingston after the ravages of the earthquake; and he felt assured that all engineers, military and civil, who would be engaged in rebuilding Kingston would be grateful to the Royal Institute of British Architects for having presented this Report, which he thought was a very clear one, bringing the matter scientifically yet simply before them. Anyone with this Report in his hands would be able to strike out confidently in the design of reinforced structures without having recourse to any particular patent system. That indicated a very great advance, and one which would be of incalculable benefit to every engineer and architect in the United Kingdom and in the Colonies.

Mr. Matt. Garbutt [*F.*] said there was a subject which had not been adverted to by any of the previous speakers. Architects in this country had to deal with buildings erected on building leases, and those buildings were expected by their clients to last for the term of the lease, say eighty or ninety years. It would not of course be reasonable to ask that they should have at this moment the result of ninety years' experience of this particular material; but from what one had seen of the rusting of metal, iron or steel, embedded in concrete, he felt convinced that occasionally such rusting would take place, and he presumed that all those who were dealing with this material would be inclined to take into account the possibility of its occurrence; and he thought it was the practice of those who contemplated using this material to consider that this rusting might occasionally happen. They knew that when a very small film of rust formed upon a small part of an iron rod it would certainly burst the concrete in which it was embedded, even if the concrete had given a thicker coating to the metal than the inch or two inches referred to in the Report. On page 7 of the Report a figure was given for the adhesion of concrete to metal of 100 lbs. per square inch. If such a thing as he suggested were to take place on any one bar, that figure of 100 would become 0 wherever that small film of rust was formed. He was not at all convinced that they would get concrete anything like waterproof in the general sense. So far as his own very limited experience went of iron or steel embedded in an inch or two of Portland cement and sand, it showed that moisture did get to the metal, and that the metal did rust. To what extent that went he had not sufficient data to say; but he had seen the metal very much rusted and the cement split up to a very appreciable extent. He was of opinion that if the Report were issued on behalf of the Institute, it should be pointed out that the adhesion of the concrete to the metal was not a thing to be relied upon. Everybody knew that the present practice of concrete steel constructors was to try to invent a specially formed bar which would have some sort of shoulder upon it to give a mechanical grip between the concrete and the metal, and that they did not rely upon adhesion. He thought it rather a pity that the Institute should put this figure forward as the basis for calculation without some careful comment.

Mr. Charles F. Marsh, M.Inst.C.E., said that with respect to what the last speaker had said about the rusting of metal in concrete they had had a great many facts, found out by several people in the past, as to the rusting of metal in the concrete, and he was of the opinion that it had certainly been proved that the metal did not rust when protected by concrete. Especially was this so when the reinforcement was washed over with grout. In any case in which large sections or large bars were used, whether the concrete was cinder concrete or

not, it was certainly advisable to coat the reinforcement with grout. One speaker had asked how this should be done. It was a very simple matter. The ordinary grout was put on with a whitewash brush, and when it was dry the bars were embedded in the ordinary way. The last speaker said that water would penetrate the concrete, and that, therefore, the metal would rust. That did not at all follow. If the water did penetrate the concrete to a slight extent it would not cause the metal to rust, because the metal was already protected.

Mr. EDWIN T. HALL [*F.*]: If it is already protected.

Mr. MARSH: It will be protected in reinforced concrete. Then as to the effect of adhesion, he (Mr. Marsh) understood Mr. Garbutt to say that the tendency of the present age was to produce a deformed bar which would prevent any sliding through of the concrete. That certainly was more or less the tendency in America, but he believed it was a great deal due to the fact that everybody wanted to make a fresh patent; hence the many deformed bars. It had been clearly shown by the experiments carried out by many authorities that a plain round bar would resist the sliding through the concrete under the ordinary stress put upon it, provided, of course, that it was bent out, or split out, at the ends—which was always the case in good construction. One speaker had referred to the care which was necessary in construction in reinforced concrete; of course there was not the slightest doubt that very great care was needed in construction in reinforced concrete; but he would point out that that care was every bit as much requisite in construction in steel. If they put in loose rivets in steel work the structure was in a very dangerous state. Only ordinary care was required in reinforced-concrete construction. The special thing that was necessary was good supervision. As they all knew, the ordinary workman was apt to shirk his work and do it in a very slipshod manner; but with careful supervision and a little choice of workmen it was easy to construct reinforced concrete which would perfectly resist, if properly designed, any stresses which might come upon it in the ordinary way. Mr. Garbutt, he believed, said that the tension in steel on page 7 would be reduced to nothing if water penetrated the concrete.

Mr. GARBUTT: The adhesion of concrete to metal.

Mr. MARSH: The metal will not be affected in properly constructed reinforced concrete. So far as the adhesion was concerned, a slight rusting of the bars, providing that any loose rust was brushed off, was rather better for adhesion than the unrusted plain bars.

Mr. GARBUTT said that while listening to Mr. Marsh a point had occurred to him which he had meant to mention before. This adhesion of concrete to metal seemed to be somewhat on the same footing with another adhesion which existed in structures, which in this country was not taken into account in considering their strength—viz. that due to the friction between surfaces of riveted members in tension, where they had a considerable surface adhesion, due to the shrinking of the rivets longitudinally, pulling the faces of the plates together. That adhesion was very considerable, and he believed in some countries engineers took it into account. It was not the custom with English engineers to do so. That was a somewhat parallel case; and a somewhat similar argument held against taking into account this adhesion of concrete to metal.

Mr. MARSH, replying: Mr. Garbutt had said that the adhesion was always neglected by English engineers in designing riveted structures. As Major Paul had just remarked to him *sotto voce*, of course the fact that the water and the moisture could get between the two surfaces of iron would tend to do away with their adhesion, which would consequently be rendered an indeterminate quantity; therefore it was very natural that they should not rely upon the adhesion of steel riveted together.

Mr. GARBUTT: Excuse me, if there is water in a boiler is the water supposed to get between the plates?

Mr. MARSH: The joints in boiler-work are calked up, and in bridge-work it is not so—at least not usually.

Mr. GARBUTT: But the calking would injure the adhesion rather than otherwise; it would open the plates a little.

Mr. EDWIN T. HALL [*F.*] asked if the Committee had taken into consideration at all the danger that might arise by fire applied to the outside of stanchions, for instance, of reinforced concrete. It had always seemed to him that there was grave danger if fire attacked cement, and the fire-engine turned its hose suddenly on to it, the concrete might split; the metal would then be exposed, and the combination of concrete and iron would give. He remembered some years ago seeing a building of six or seven stories high carried entirely as to its external walls on piers of reinforced concrete about 14 inches square, and it seemed to him, if the fire engines were attacking that with water, there would be grave danger of the concrete splitting off and the building collapsing. He had known of some very grave collapses where rust had got at the metal in reinforced concrete. He had heard from an engineer some time ago of some large reservoirs in Spain where the water got through fissures in the concrete and attacked the metal, which rusted very badly, and the reservoirs leaked considerably in consequence. It seemed to him that one of the gravest things in the use of reinforced concrete was the personal equation. If one could be sure

that every man had done every little piece of work thoroughly well, one was safe; but if one man was careless, he might ruin the whole structure. One had seen, of course, a lot of reinforced concrete used, and it was very common with the makers not to cover their bars with cement. It was always put in the specification, but he had again and again seen it neglected. There was grave danger, once the rust was started. If they could ensure that the metal was always covered with cement they were safe. Supervision was of the greatest importance, and skilful workmen were of still greater importance.

Mr. J. J. BURNET, A.R.S.A. [*F.*], said he did not mean to raise any technical discussion upon reinforced concrete. He wished to ask a question which perhaps was a little premature, but the discussion showed how very varied were the opinions, not of the use of reinforced concrete, but of its construction, and what he rose to ask was, how far were they going with this? As a member of the Institute he was deeply sensible of the obligation they owed the Committee for the production of this Report, but he would be exceedingly nervous if there were the least chance of its being issued, and being taken as a text-book issued by the Royal Institute of British Architects. He seriously doubted the advisability of the Institute issuing any such text-book.

Mr. WILLIAM DUNN, replying to Mr. Hall as to stanchions and the action of fire, said he thought reinforced concrete had had a very good test in regard to the action of fire upon it in the Baltimore fire, where numerous buildings in reinforced concrete were exposed to probably more severe fire than they ever could have been here. If a stream from the fire hydrant were directed upon a brick pier under very high pressure, combined with heat, the corner first and probably the whole pier would be knocked away. He had had some little experience of the power of a stream of water at close quarters: it would batter down a thick wall in course of time. Reinforced concrete at an inch or two back from the surface had vertical steel rods bound together with iron wire at intervals, and the columns as recommended to be made in this Report had the corner splayed off. The corners are the source of weakness, and they are to be splayed off. No fireman in his senses, he should think, would direct the fire hydrant at high pressure at any structural support. That would, he imagined, have an equally great effect upon a piece of brickwork. Reinforced concrete had been so well tried under the action of fire that one had no fear about those things. As to what Mr. Burnet said about the Institute issuing this Report as a text-book, or with the support of its authority, he conceived that the whole object of the Report was that it should be issued. The great majority of members of the Institute were likely enough any day to use reinforced concrete. Hitherto they had been in the hands of patent manufacturers, who all came to them with most wonderful tales (and the less one knew about it, the more wonderful were the tales) of what it would do. They wanted something authoritative on which they could say, "If you make me an estimate, base it upon these Rules." Those Rules were in all practical matters the same as those which had been adopted by the Prussian Government, the French Government, and other Governments who had conducted long and elaborate experiments. To fail to adopt this Report would be to render all this labour of no avail, and to leave architects without any of that guidance which they all felt necessary, and he should ask the Institute to consider very seriously before rejecting the Report. It was a thing they all wanted. He was quite sure that everybody felt the need of it. Public bodies required it, private individuals required it, and the names of those on the Committee were sufficient guarantee. Professor Unwin was a man of world-wide reputation, who would not put his name to anything that was not perfectly sound, and there were other gentlemen—Mr. Marsh, Colonel Mayne, Sir Henry Tanner, and others—who had worked out this question, and given them the benefit of their study and labour. To fail to adopt the Report would be a great mistake.

Mr. BURNET said he was sorry if his remarks had tended to throw any doubt upon the value of the Report or the eminence of the names which were attached to it. He had no intention of so doing; his plea was simply for the consistency of the Institute. They in the Institute were architects and designers, and they had to take the responsibility for every material they used. Text-books, as it seemed to him, were to be issued by their authors, and the Institute, with all deference, was not entitled to be the author of text-books, or, as a body, to accept a responsibility which ought to be incurred by the individual or individuals who published a text-book. That was only his opinion; he thought it was a sound one, or he would not trouble the Institute with it.

Sir HENRY TANNER, in responding, said that those who had made a study of reinforced concrete had, of course, great regard for it in the future. So far as he himself was concerned, he had started about three works with it, one of which was rather a large one, so that he had some sort of faith in the work. As to economy, there was no question about it. One of the works he had in hand in this material cost about twopence a cubic foot for the carcase—of course without any finishings—merely the reinforced concrete. They could not touch that under certainly twice the sum of money in any other material. Mr. Hall had referred to some reservoirs in Spain. So far as his experience of that country went, he did not think whatever happened in Spain need be regarded as of any moment whatever. He was in Madrid at the time of the accident to the Madrid Reservoir, when there were about thirty

people killed and three or four times that number injured. The work was altogether too slight for its purpose. It was no wonder the accident happened—it was bound to happen sooner or later. With reference to what Mr. Burnet had said, Mr. Burnet looked upon it from another point of view altogether. There was, of course, not much art about reinforced concrete. It was really a practical matter, and one could not get much beauty out of it, he must confess; but at the same time, in works of any magnitude, it was incumbent upon architects to make use of it where cost was of any moment. Wherever one could economise there was no object in spending money; therefore it was a right thing to use. Other materials could be used for the fronts and all the visible parts where appearance had to be considered. It was no good burking the question; reinforced concrete would have to be used. Then if the architect chose to go to a specialist to devise such a building for him he did not see how he could get away from responsibility entirely. He himself had employed an agent of a well-known patent in two cases; but he (the speaker) had to bear the brunt if anything went wrong; therefore he had to see that what the specialist was doing was likely to prove satisfactory. He did not think his department would be satisfied with him altogether if anything happened to one of those buildings which he had suggested should be put up, notwithstanding that they employed a specialist, and paid him his percentage, just as they should any engineer they employed. All the other questions he thought had been replied to by Mr. Dunn, Mr. Marsh, and Major Paul, and he did not think he could usefully add anything. His experience was not very old in this material; but at the same time he had great faith in it, and that, he thought, he had shown.

The President: It is my duty now to put to the Meeting that this provisional Report be adopted by this Meeting. I presume that it is a provisional Report, and the Committee will take into consideration some of the criticisms which have been made here to-night.

Sir Henry Tanner: We thought, subject to any possible errors being put right, the Report would be adopted now.

The President: Then I put it that, subject to these criticisms being considered by the Committee, the Report be now adopted. The President, continuing, said he did not quite agree with Mr. Burnet's fear that they should not put this forward from the Institute. The stone on a building was, after all, more or less of a veneer; it was not altogether construction. It did not matter very much whether that was backed up by brickwork or by reinforced concrete. It must have a backing of some kind, and, if reinforced concrete was cheaper and more substantial than brickwork, he did not see why as architects they should not adopt it. Of course, one would imagine that it was going to make a revolution in architecture altogether. It might or it might not. He did not think it would make such a revolution as the steamboats did with shipping; but if it did, let them hope that the architects of the future would be able to make an architecture equal to the naval architecture of their own battleships nowadays. He himself knew nothing of this subject, so that he would not speak technically upon it; therefore he would just put to the Meeting that this very interesting Report be adopted by the Institute.

The motion was carried unanimously.

The President: Mr. Slater also moved a vote of thanks to the Concrete Committee, which was duly seconded, and which I have very much pleasure in putting to the Meeting. The Committee have spent an enormous amount of their very valuable time in producing this Report, and I am sure that the thanks of this Meeting and of the whole Institute are due to the Committee for their labours.

The vote was carried by acclamation.

Mr. F. T. Reade [*H.A.*] sends the following contribution to the discussion:—

I have read the Committee's Report, and most thoroughly agree with them in their proposals as to the quality of the materials and the rigid testing of same. But the part of their Report that appeals to me is in the words following: "Structures of this kind appear to be trustworthy," and, in my opinion, for columns and girders it is an *appearance* of trustworthiness only. There is no doubt that for fire-resisting roofs, dormers, and partitions, and for fire-resisting floors, ferro-concrete can be used with the best results; but for columns and girders this principle of construction is extremely risky and unreliable. The use of two such heterogeneous materials as concrete and steel in the construction of girders and columns would be sufficient to condemn the construction in the mind of any engineer out of a lunatic asylum. The dreadful catastrophe in the failure of the Roo Dee Bridge, near Chester, about the middle of the last century was ascribed to the use of cast and wrought iron, in the same structure, under improper conditions, and it is clear that these two materials approximate to homogeneity far more closely than concrete and steel. The failures of beams so constructed have been many, and we need not wonder at them when we remember that the designers of ferro-concrete beams trust largely to what may be called "stickshon," or the adherence of the concrete to the surface of the steel, for resistance to the various stresses in the beam; and even if "stickshon" could be considered reliable, how can we expect to get it when we know that the filling-in of the centering is done by an unskilled workman whom someone has defined as "a fool with a spade"? And now as to the comparative cost of these beams and steel joists and riveted girders: I notice that the Report gives the working stress of the tension

bars of ferro-concrete beams as seven tons per square inch. This is the usual stress provided for in the bottom flanges of steel joists and riveted girders; consequently the area and weight of these flanges and of the tension members must be equal, and for the upper part of the concrete beam: when the cost of the concrete, the centering for same, the shoring of the centering, the careful punning of the concrete by "the fool with the spade," and finally the striking of the shores after waiting from four to twenty-eight days for proper setting of the concrete—when all these items are paid for, I do not believe there will be much financial gain by the use of ferro-concrete beams, and where they *are* used you have a risky and unreliable form of construction, also a tedious process of fixing, whereas by the use of steel joists or girders you have a perfectly safe and easily fixed construction which requires no centering, and can be loaded up one hour after fixing. I notice the Report assumes that ferro-concrete girders may be made continuous; the continuity of the girders will increase the load on the columns, and for a warehouse of four floors above the ground the load from columns at ground level might easily be 200 tons, and with this load resting on the continuous girder where the bending moment is greatest I think the ferro-concrete beam would certainly be crushed. The junctions of these beams and columns must always be a weak point, for I have never yet seen any attempt to produce on a concrete column any projecting brackets to receive the ends of girders where non-continuous. In the case of ferro-concrete columns being made continuous through four or more floors I have never been able to imagine any possible satisfactory junction, so I conclude that even the most enthusiastic ferro-concreter never contemplated the possibility of making and delivering a column about 60 feet long. It will be in the memory of many architects that in the old days the junction flanges of cast-iron columns and stanchions were *not* turned, and absurd packings of sheet lead were put between the flanges with the hope of getting something like a uniform bearing. This has long been discontinued, but even that "tin pot" form of construction might be considered almost perfection when compared with any junction of the ferro-concrete columns. And, finally, I do not think that any safe scheme has yet been designed for discharging the accumulated loads up to, say, 200 tons in the basement on to the brick footings and concrete. There are many formulæ for calculation in the Report, and no doubt it would be possible to devise similar formulæ for many materials, such as dried clay, or even stale quartern loaves, of course reducing considerably the stress limit; but I would strongly advise all architects not to be influenced by the apparently safe results of any calculations, but to sternly banish all ferro-concrete beams and columns from any buildings they may be constructing or designing. Cast iron columns or stanchions, or riveted sections for same in steel, and rolled steel joists, and riveted girders, when cased with concrete, are just as reliable as the ferro-concrete for fire-resisting purposes, and not much more costly.

Mr. L. H. Rugg, A.M.Inst.C.E., Chairman of the Junior Institution of Engineers, writing since the meeting, states that it gave him much pleasure to attend the meeting as a guest, but regrets that the time at the disposal of the meeting did not admit of a fuller discussion. The Junior Institution of Engineers and the Discussion Section of the Architectural Association had a joint Paper on this subject last year, when the discussion was continued over two evenings. Referring to the matter of the Provisional Report, Mr. Rugg draws attention to the vast difference in concrete aggregates and percentages of reinforcements in various designs, and continues:—

Architects are frequently called upon to decide on the merits of several schemes. Cinder and rock concretes enter into competition, and reinforcements varying from $\frac{1}{2}$ to $2\frac{1}{2}$ per cent. Cinder concretes of low crushing strength are cheap, furnace clinker and hardcore forming the chief constituents, all of which can be purchased in the neighbourhood of 2*s.* 6*d.* per cubic yard. On the other hand, screened Thames ballast to pass $\frac{3}{4}$-inch ring with the sand taken away or similar broken stone or granite would cost more than twice this amount. The best plan is to require the exact crushing strength of the concrete proposed, and take one-fourth or one-fifth, as mentioned on p. 7. In regard to reinforcement, a very simple plan is to divide the bending moment by two-thirds of the depth of the beam in order to obtain approximately the total stress. This divided by the area of metal provided would give the approximate stress per square inch for purposes of comparison.

The importance of supervision cannot be overrated, especially when the builder who is taking over the whole contract is allowed to do this work. In general, the best plan is to allow firms specialising in this work to sub-contract for the same. These firms have a reputation to keep up, and will exercise careful supervision themselves; but it is equally desirable to employ one's own inspection as well. Eventually, no doubt, large works in reinforced concrete will be confined to a few firms only who can be implicitly trusted.

No mention is made as to deflection in the Provisional Report. This is an important point, and should have consideration. It would appear desirable to fix a minimum depth for given spans, for, although the same strength may be present in two different designs, yet the deflection in one of them might be a serious item. Floors should be tested to 50 per cent. of the safe loads. It is also important to note that the safe loads should be over and above the dead loads, which are frequently very considerable in ferro-concrete structures. In

regard to sub-paragraph 3, on page 6, a difference should be allowed for warehouses compared with factories or office buildings. Warehouses may frequently be loaded to the full extent on each floor, and no deduction should be made in descending floors for this class of building.

No notice is taken in the Report of the fact that horizontal reinforcement in columns adds very materially to the strength. Five hundred pounds is low where plenty of horizontal reinforcement is used. This is most important, as the lower columns for a tall building (especially a warehouse, as mentioned above) will be absurdly large. It is recommended that a better class of concrete be invariably used for columns, together with ample horizontal reinforcement. The actual amount of material in columns is small, and the extra cost for first-class material is consequently small also. By this means column diameters can be reduced, and the safety of the structure will be equally as good.

In conclusion, it is necessary to call attention to the necessity for machine mixing on all work other than the smallest jobs. Concrete cannot be satisfactorily mixed by hand, as one batch badly mixed may happen to be placed where the maximum strength is demanded. In regard to machine mixing, batch mixers should be employed, and not continuous. Every batch is then known to have exactly the right proportions for the concrete.

THE DEVELOPMENT OF LONDON.

THE continually chaotic growth of London must cause the greatest apprehension as to what its future will be. Is it not time that the influence of the Institute was brought to bear on this important matter?

It appears to me that it should be the urgent duty of the Royal Institute of British Architects to interpose before it is too late in the interests of the future artistic development of London. It is surely not too much to ask of the Municipal Government of London that it should seek the advice of a body representative of the architecture of Great Britain on all matters which concern the artistic aspect of the city. It is not fair to the members of a great profession that its representative council should be left out of count in matters which so closely concern it, and on which it claims a right to expert opinion. If we compare the state of things in London with that of other important centres, even of our own provincial towns, we shall find that London shows relatively little regard to the opinion of experts on matters of art. It is incredibly foolish that on such subjects as the Traffic Commission no architects were appointed; yet the Commission ought to have been as much concerned in the architectural point of view as any other. Mere engineering feats of practicability are not everything, and the artistic direction of such matters is a thing of paramount importance.

One by one every fine chance in London is being lost. It is lamentable to think of what Ludgate Circus might have been; it is still more pitiful to see the magnificent opportunity that was in waiting all about the great Strand improvement. Here was a basis of Somerset House and Waterloo Bridge which offered one of the finest points of departure that the greatest enthusiast could have dreamt of. Trafalgar Square, which it is pretended is the finest site in Europe, is a mere dumping ground for ugly hotels and shipping offices and business establishments. Buckingham Palace and its magnificent Mall have only been saved by the exceptional ability of an architect who could combine art with common sense. Hyde Park Corner is an incoherent jumble of stupid lines. Piccadilly Circus is distinguished by the equally opposing claims of a singularly clever but unsuitable fountain and a graceless urinal. Oxford Circus, Langham Place, and Portland Place, with Regent's Park in line beyond, are waiting for a fine scheme. The County Hall site and the southern Thames Embankment will follow in the wake of all the other failures unless something better than engineering designs are allowed to prevail.

It would be beyond the limits of a note of this kind to complete a list of the opportunities which lie in waiting for London. Even with all the lost chances there are enough left to be worth taking account of. We may well take a lesson from those which are now lost beyond recall, and set to work to plan developments which shall lead up to something more worthy of the greatest city in the world. I can imagine enough work laid out in this direction for the Institute through its Art Committee to last it for many years, and to absorb the best talent which can be laid under contribution. At present we are all asleep as a public body. Mr. John W. Simpson,* Professor Beresford Pite,† Mr. Paul Waterhouse,‡ and others have sufficiently proved by their writings that there are some at least amongst us who can take wide, enthusiastic, and withal practical, views of this great subject. And the marvel of it is that nothing happens.

The reading of papers appears to lead to no practical result, and I suggest that a definite and practical step be taken by the Institute in this matter, and that a more or less *permanent* committee be appointed to work in collaboration with the Art Committee to deal with it.

T. RAFFLES DAVISON.

* JOURNAL R.I.B.A., Vol. XII. 3rd series, p. 341.
† *Ibid.* p. 356.
‡ *Ibid.* Vol. XIII. p. 373.

A WORD-PAINTER OF ARCHITECTURE.

AFTER a long and painful illness the death is announced from Paris of Joris Karl Huysmans at the comparatively early age of fifty-nine.

As a young man Huysmans entered the Department of the Interior, where his orderliness and precision marked him out for advancement; but it was as an author, not as a functionary, that he was destined to become famous. His first book, *Le Drageoir aux Épices*, for which he had some difficulty in finding a publisher, appeared in 1875. It was followed by *Marthe, ou l'Histoire d'une jeune Fille*, *Les Sœurs Vatard*, and others, which showed at that time his sympathies lay with the "naturalists"; indeed, so intimate was his connection with them that he assisted Zola in the publication of the weekly "organe du naturalisme," *La Comédie humaine*.

But with Huysmans naturalism was only a passing phase which gave place, strangely enough, to mysticism, to which he abandoned himself so completely that the whole course of his life was changed. He left his rooms in the Rue de Sèvres, which he had occupied for thirty years, and retired to Ligugé, near to Poitiers, where, under the shadow of the abbey, and afterwards in Paris, whither he returned upon the expulsion of the Benedictines, he passed a life half literary and half religious, and wrote the books of his later manner, *La Cathédrale*, *L'Oblat*, *Sainte-Lydwine de Schiedam*, and others. It is principally as the author of the first named that his death deserves to be noticed in the JOURNAL.

As Mr. Street remarked in his review which appeared in the JOURNAL of 27th August 1898, the story, such as it is, of *La Cathédrale* passes in Chartres, and the book is largely made up of lengthy architectural descriptions, principally but not solely of Chartres Cathedral and its surroundings. As an example of its style one might quote some parts of the passage in which Durtal, the hero of the story, reviews some of the towers with which he is acquainted. "Examinons," says he, "les tours de Notre-Dame de Paris, elles sont mastoques et sombres, presque éléphantes; fendues dans presque toute leur longueur, de pénibles baies, elles se hissent avec lenteur et pesamment, s'arrêtent; elles paraissent accablées par le poids des péchés, retenues par le vice de la ville au sol; l'effort de leur ascension se sent et la tristesse vient à contempler ces masses captives que navre encore la couleur désolée des abat-sons." From Paris he turns to Rheims. "A Reims, au contraire, les tours s'ouvrent du haut en bas, en des chas effilés d'aiguilles, en de longues et minces ogives dont le vide se branche d'une énorme arête de poisson ou d'un gigantesque peigne à doubles dents. Elles s'élancent aériennes, se filigranent; et le ciel entre dans ces rainures, court dans ces meneaux, se glisse dans ces entailles, se joue dans les interminables lancettes, en lanières bleues, se concentre, s'irradie dans les petits trèfles creux qui les surmontent. Ces tours sont puissantes et elles sont expansives, énormes, et elles sont légères. Autant celles de Paris sont immobiles et muettes, autant celles de Reims parlent et s'animent." Then he goes on to speak of the towers of Laon with their lowing oxen, of Amiens, of the central tower of St. Ouen, and others, and concludes: "Mais, quand même, la tour, sans le clocher qui l'effile, ne se projette pas dans le firmament. Elle s'élève toujours lourdement, halète en chemin et, exténuée, s'endort. Elle est, un bras sans main, un poignet sans paume et sans doigts, un moignon; elle est aussi un crayon non taillé, rond du bout, qui ne peut inscrire dans l'au-delà les oraisons de la terre; elle reste en somme à jamais inactive."

This, especially the concluding sentences, is a good example of Huysmans's love of strange and unexpected figures. Surely no one else has ever compared a tower without a spire to a wrist with neither palm nor fingers, to an arm without a hand, to a mere amputated stump. Still less has anyone else ever thought of likening it to a pointless pencil unable to write the prayers of earth upon the clouds of heaven.

For the invention of singular and unexpected metaphors to force home his descriptions, Huysmans possessed an extraordinary ability. Take this picture of the entrance to the Abbé Gévresin's lodging at Chartres:—"Ils gravirent un escalier étroit, bordé d'une rampe rouillée de fer. Les murs ruisselaient d'humidité, secrétaient des roupies, distillaient des gouttes de café noir; les marches étaient creusées, s'amincissaient du bout ainsi que des cuillers; elles conduisaient à une porte badigeonnée d'ocre dans laquelle était planté un bouton de fonte, couleur d'encre. Un cordon de sonnette balançait un anneau de cuivre qui se cognait remué par le vent, contre le plâtre éraillé du mur. Une indéfinissable odeur de vieille pomme et d'eau qui croupit, s'échappait de la cage de l'escalier, précédé d'un court vestibule que pavaient des rangées de briques, couchées sur le flanc, rongées à la façon de madrépores, que plafonnait une sorte de carte de géographie, sillonnée de mers dessinées comme avec de l'urine par des infiltrations de pluie."

In this passage the figures employed are grotesque, inelegant, even coarse; but they are only means to an end. That end is to picture the whole scene complete to its minutest detail; and that accomplished, the means, whatever they may be, are justified. That Huysmans does succeed in attaining his end is unquestionable. The neglected staircase with its rusty hand-rail and worn steps, the damp oozing from the walls, the bell-rope blown hither and thither by the wind, every detail is brought before us as vividly, as distinctly, as realistically, as by a photograph.

For the architects of the present day Huysmans

had a great contempt. "Les gens qui s'affublent de ce nom," he makes Durtal say of them, "sont des cambrousiers, des maçons dénués de tout personnalité, de toute science. Ils ne sont seulement plus capables de plagier adroitement leurs devanciers! Ils sont quoi, maintenant? des rapetasseurs de chapelles, des ressemeleurs d'églises, des fabricants de ribouis, des gnaffs!"

But we need bear him no ill-will for his hard words. He is dead, and the world is the poorer by the loss of a man who possessed in an eminent degree, not only the power of seeing, but also the perhaps rarer power of conveying to others his impressions of the things which he had seen.

BENJAMIN WALKER.

Erdington.

COUNSEL'S OPINION.

Architects and the Workmen's Compensation Act.

As stated in the Annual Report of the Council (*ante*, p. 460) questions regarding the Workmen's Compensation Act on various points in which architects are likely to be affected have been submitted by the Council to Mr. Alfred Henry Ruegg, K.C. The learned Counsel has given his opinion as follows:—

OPINION.

The following questions have been submitted to me under the Workmen's Compensation Act 1906:—

1. *Under the Act will the Client or Building Owner be responsible or actionable for accident or damage that may happen to the Clerk of Works* (a) *if paid directly by him, or* (b) *if paid by the Architect, the latter being in this case virtually the Agent for the Client?*

I am of opinion that the Client or Building Owner will be responsible or actionable for accident or damage that may happen to the Clerk of the Works, whether he be paid directly by the Client or Building Owner, or by the Architect as Agent for the Client or Building Owner. If employed and paid directly by the Building Owner no question can arise. He is clearly the servant of the Building Owner.

If paid by the Architect—as I understand he is generally selected by the Architect and conforms to his orders—care must be taken to make it quite clear that the Architect is only the Agent of the Building Owner.

To this end I should advise that a small printed form should be drawn up and adopted by the Architects of the Institute to the effect that they engage "A. B." as Clerk of the Works on the Buildings as Agent for and on behalf of "C. D.," the Building Owner. The form should also contain a clause that "A. B." agrees to serve the Building Owner for the consideration set forth, and to obey the orders and directions given by the Architect on behalf of the Building Owner.

I understand that in all cases the money comes from the Building Owner, and is never paid by the Architect out of his commission.

2. *Is the Architect liable for damage or accident that may happen to his Assistant when employed either in his office or superintending works of Buildings in progress?*

I am of opinion that the Architect is liable for damage or accident that may happen to his Assistant either when employed in his office or when superintending works of Buildings in progress.

The Assistant, whether himself an Architect or not, is, I understand, a permanent servant of the Architect, employed and paid by him, and under his sole control.

In each of the above cases it is necessary that the accident should arise out of and in the course of the employment, and that it should not (except where the injury results in death or serious and permanent disablement) be attributable to the serious and wilful misconduct of the injured person himself. (Section 1.)

It is also necessary (except where the employment can be described as manual labour) that the remuneration should not exceed £250 a year. (Section 13.)

3. *What is the position occupied by Architects under the Workmen's Compensation Act* 1906 *with respect to their pupils, articled to them by Indenture in the form used by the Royal Institute of British Architects?*

I am of opinion that a pupil so articled is a workman within the meaning of the Act; and that the Architect to whom he is bound is his employer, and consequently liable as hereafter stated to pay compensation to the pupil or his dependants in case of injury or death arising from accident happening in the course of his employment and arising out of his employment.

The relation of master and servant, or employer and workman, arises out of a contract of service. Apart from the express covenant in the Articles of Pupilage, a contract of apprenticeship is a contract of service, and of itself establishes the relation of master and servant.

An apprentice receiving no salary is in my opinion not entitled to weekly compensation under the 1st Schedule (1) (b) of the Act, for the compensation is based upon the "earnings," and cannot exceed 50 per cent. of such earnings. In case of death also, when no salary has been paid, I think no compensation becomes payable, for the claim of

the dependants must be founded upon dependency, either total or partial, on the deceased workman's "earnings" at the time of the death—Schedule 1 (1) (a). Where a small salary is paid by the Architect, I think the pupil would be entitled to receive as weekly compensation a sum not exceeding 50 per cent. of whatever such salary, when computed into weekly payments, amounts to.

If the injury results in death, and the pupil who is receiving a salary leaves dependants wholly dependent on his earnings at the time of death, the dependants would become entitled to a sum equal to the earnings of the pupil for the three years preceding the death, if he has been so long employed, with a minimum of £150. If the pupil had not been employed for three years, then the sum would be 156 times his average weekly earnings during the period of his actual employment as a wage-earning workman.

In case of death, where the dependants are not wholly dependent, such a sum, not exceeding the above amounts, as an arbitrator might think reasonable.

I must point out that if the pupil is under twenty-one years of age at the date of the injury, and his average earnings are less than 20*s.* a week, he may be awarded 100 per cent., instead of 50 per cent. of such earnings, in case of incapacity, but not in any case exceeding 10*s.* a week—Schedule 1 (1) (b) (c)—and where, in such a case, the amount of compensation is reviewed after twelve months, the compensation may be increased to 50 per cent. of the weekly earnings which the workman would probably have been earning at the time of the review, if he had not been injured—Schedule 1 (16).

4. *What is the liability (if any) of the Building Owner towards the Architect employed by him?*

I am of opinion that (except in the unusual case of an Architect in the permanent employment of a person, or public body, who has contracted to serve such person or public body and to perform his duties under their control, and who receives less than £250 a year) the Architect is not a servant or workman of the Building Owner, and such Building Owner incurs no liability to him under the Workmen's Compensation Act 1906. The Architect who undertakes to superintend building operations for a commission does not enter into the service of the Building Owner, or contract to serve him. He is in law a contractor, and, so long as he carries out the terms of his contract, is quite independent of any control on the part of any Building Owner.

SPECIFICATION FOR PAINTS.

[JOURNAL, p. 479.]

THE specification published in the last number of the JOURNAL seems open to a few obvious criticisms from a practical standpoint.

To begin with, it is not stated whether the percentages include the oil in which the colours are ground, and most colours for painting are purchased already ground in oil.

The matters most affecting quality in painting are the purity of the white lead and of the linseed oil. I am not a chemist, but the specification of the white lead appears quite inadequate. It might at least define that it should contain no foreign substance. The linseed oil is not mentioned, except in connection with terebine; and in that experiment the time of drying might depend on the purity of the oil. It is important that even pure linseed oil (and much of that sold is *not* pure) should have been stored for at least twelve months.

Varnishes, when used, come next in importance to oil. The specification treats them all together, and names "best pure gums and oils"—a perfectly vague definition. Varnishes differ, and are used for very different purposes. The best varnish for a garden gate is not the highest-priced varnish which would be used in a drawing-room. The varnish for use on a lavatory paper is not made with oil at all, but with turpentine. A varnish for external use should *not* be a quick-drying varnish, and would not dry in twenty-four hours in cold or damp weather. A good interior varnish would in dry summer weather dry in half the time. The specification test is illusory. If the surface on which it was used were at all greasy, the best of varnishes would not dry at all.

English Gold Leaf.—Nothing can be worse than the specification "unadulterated with any foreign material, and must be supplied to whatever tint is required." The thickness or weight of gold is not alluded to. All gold leaf must contain alloy. Pure gold cannot be handled as leaf. The tint depends on the nature and quantity of alloy, which should be limited to a percentage maximum. For deep-toned gold leaf, copper is the alloy; for pale gold, silver.

With such pigments as purple brown, Indian red, Venetian red, burnt sienna, the important matter is that they should not be artificially stained with fugitive vegetable or aniline colours, and that they should be finely ground.

Altogether the specification exposes the painter or contractor to a number of adverse and illusory tests, and does not provide practical or useful tests.

J. D. CRACE.

9, Conduit Street, London, W., 1st *June* 1907.

CHRONICLE.

The County Hall Competition.

The Special General Meeting convened by the Council on the requisition of members to discuss the Conditions of the County Hall Competition was duly held on Tuesday, 28th May. There was a good attendance, and the meeting lasted two hours and a half. Exigencies of time and space do not admit of the discussion being included in the present issue; but the gist of the proceedings is given in the Minutes printed at page 512, and the discussion will be reported in the next number of the Journal, together with the correspondence between the Institute Council and the London County Council which was read at the Meeting.

Resignations from the Council.

Messrs. J. S. Gibson, A. W. S. Cross, C. E. Mallows, and H. V. Lanchester have resigned their seats on the Council for the remainder of the Session.

Visit to Edinburgh and Annual Dinner, July 4-6.

Members have already had intimation that the Annual Dinner is to be held this year at Edinburgh on Friday, 5th July, during the visit which the Institute is making to that city at the invitation of the Edinburgh Architectural Association. A very interesting programme has already been drawn up by the Association. The first function of the visit will be an evening reception given to the Institute by the Lord Provost and Magistrates of Edinburgh in the City Chamber on Thursday, 4th July. The arrangements for Friday the 5th and Saturday the 6th are as follows:

Friday, 5th July.—9.30 a.m. Visit to Edinburgh Castle, under guidance of Mr. Hippolyte J. Blanc, R.S.A., President E.A.A.—11.30 a.m. Visit to St. Giles' Cathedral, under guidance of Mr. Thos. Ross, F.S.A. Scot.; and to Parliament Hall, under guidance of Mr. W. T. Oldrieve, F.S.I., H.M. Principal Architect in Scotland.—1 p.m. to 1.45 p.m. Luncheon at the Carlton Hotel, North Bridge Street.—2.15 p.m. Visit to Holyrood Palace and Chapel, under guidance of Mr. W. T. Oldrieve, F.S.I.—4.15 p.m. Visit to the Edinburgh Architectural Association's Exhibition of Drawings and Photographs in the Royal Scottish Academy, National Gallery.—Afternoon tea will be served in the Academy.—7.30 p.m. R.I.B.A. Annual Dinner in the Caledonian Station Hotel, Princes Street.

Saturday, 6th July.—Visit to Roslin Chapel and Roslin Castle, under guidance of Mr. Thos. Ross, F.S.A. Scot.—Informal visit to George Heriot's Hospital School, Lauriston. Conductor, Mr. Hippolyte J. Blanc, R.S.A.

As is usual on these Institute visits, ladies may accompany members on all the excursions, &c. Special railway arrangements will probably be made for members and their friends travelling from London on Thursday the 4th.

Post Office Buildings.

Mr. Sydney C. Cockerell, in a recent letter to *The Times*, calls attention to the unsatisfactory character, architecturally, of the buildings put up by the Post Office authorities in every town and nearly every large village in England. "An opportunity," he says, "is given them for setting an example of reasonable and comely building throughout the land, such as was set in the metropolis by the School Board when it dotted London with the unpretentious but handsome and beautifully proportioned schools which are the only agreeable things one can see from the train in many of the poorer districts. The London County Council has admirably followed this lead in its fire stations and workmen's dwellings. But wherever one goes the post-office is pretty certain to be a veritable eyesore, totally unworthy of a great department. One may guess that the decision as to the character of a new building is too often left to the taste and judgment of the local postmaster, acting in concert with a local and unenlightened architect. Whether this be so or no, every one will admit that the result is usually deplorable, and that an architectural department of quite another kind from that at present existing is sorely needed at St. Martin's-le-Grand."

The World Capital at the Hague.

Mr. James S. Gibson [*F.*] writes in the *Review of Internationalism*:—

The proposals to found a World Capital at The Hague, to which Dr. Eijkmann and Mr. Horrix have given such great attention, and the preliminary plans prepared by Mr. K. de Bazel for the laying-out of such a city to the north of The Hague were matters of considerable interest to me when I went to Holland and walked over the site, which at present consists of sand dunes and wooded lands extending along the sea coast.

The site itself, which I believe is the property of the Dutch Government and the Municipality of

The Hague, is an admirable one from the point of view of its proximity to the present city (to which it could easily be linked by means of an electric tramway) and affords exceptional opportunities for the laying-out of an ideal city.

It is greatly in favour of such a project that no existing structures need be destroyed or removed to make way for the development of such a city.

The land at present is in the natural state, and it is proposed to retain as many of its natural characteristics as possible, and to take advantage of these in forming the different parts of the proposed World Capital.

An important part of the scheme is to establish a number of international institutions; these being large and imposing structures would form a centre round which the city might be grouped, and would give an architectural character to the central part.

It is very rarely that such an opportunity occurs to lay out on virgin soil the scheme for a complete town, with its different divisions necessitated by the requirements of the inhabitants who are to carry on therein the work of their lives, and I think that this opportunity has been admirably handled by those men who have devoted so much time, thought, and skill to the maturing of the idea.

The site in itself is exceedingly suitable, and the manner in which the project has been considered argues well for its successful carrying out. I feel confident that its fruition will be watched with great interest by all thinking people, while its architectural development should secure the hearty sympathy and co-operation of all architectural societies throughout the world.

Commendatore Boni's Visit to England.

Commendatore Giacomo Boni [*Hon.Corr.M.*], Director of Excavations in the Roman Forum, has just completed a course of lectures on Recent Discoveries in Rome, delivered under the auspices of the University of London at King's College. The distinguished lecturer dealt with (i.) The Geological Conditions of the Site of Rome, and its Primitive Inhabitants; (ii.) Rome before Romulus, and its Burial Places; (iii.) The Religion of the Early Romans, and its Monuments; (iv.) The Forum and Comitium as Centres of Political Life to the End of the Republic; (v.) Recent Discoveries of Imperial and Early Mediæval Remains in the Roman Forum; (vi.) Late Researches in the Forum of Trajan, and Projected Explorations.

Commendatore Boni, lecturing before the members of the British Academy on "The Column of Trajan: Latest Researches," said that it was in March 1906 that he turned his special attention to the Column of Trajan. At that time it had been believed by archæologists that the column had been erected to indicate the height of a hill cut away in order to level the area for the Forum Ulpium, and it was doubted, or denied, that the column had been used as a sepulchre. As this view did not seem to be in accord with the few statements of ancient writers on the subject, and as the dedicatory inscription (AD . DECLARANDVM . QVANTAE . ALTITVDINIS . MONS . ET . LOCVS . TANTIS . OPERIBVS . SIT . EGESTVS) did not clearly confirm it, he thought it essential in the first place to try to ascertain whether the column did or did not actually contain a sepulchral chamber. There was on the southern side of the pedestal a loophole (like those admitting light into the spiral staircase), and in the inner vestibule at the base of the column there were still visible traces of a door which had been walled up and plastered over. Commendatore Boni removed the plaster, cut away part of the masonry, and found that the door led into a small atrium, turning to the right, where a second door was discovered. This second door led into a chamber 10 feet long, 5 feet wide, and 6 feet high. On the outer wall of the chamber were the bricks which closed up the loophole which had first attracted his attention on the outside. Within this chamber were the remains of a funeral table, 2½ feet high and 4 feet wide. Just above the table, in the marble wall of the chamber, holes had been drilled in such a way as to suggest that clamps going out from the wall had supported on the table two urns, one towards one end, one towards the other of the table. Now an inscription, still preserved in the Vatican Lapidarium, stated that Hadrian had erected a temple *parentibus suis* in honour of his parents "Trajan and Plotina." This temple had stood close to the column, and as it was the custom to erect such temples close to the burying-place of the persons to whose honour they had been erected, the natural conclusion was that the chamber was a sepulchral chamber, and that the table had supported two urns containing the ashes of Trajan and his wife, the parents of Hadrian. The main object of the column was therefore plainly that of a sepulchral monument, and in Commendatore Boni's opinion the somewhat obscure words of the inscription, which had given rise to the belief that the object of the column was to indicate the height of a hill cut away, had been misunderstood. On making careful trigonometrical calculations of the height of the column, he found that it was a *columna centenaria* exactly 100 feet high, so exactly, indeed, that by means of it the length of the Roman foot could be ascertained with greater precision than had hitherto been reached. It was, to say the least, unlikely that any hill would have been so exactly of this height. Furthermore, ancient authors in their references to the Forum Ulpium had made use of such expressions as seemed to exclude quite decisively the existence of any hill on the spot now occupied by the column. To make sure of this point Commendatore Boni dug various pits in the vicinity, and also across the whole width of the valley occupied by the Forum Ulpium. He found that on the level which

would have been formed if a hill had been cut away there were not the geological strata which in that case would have been laid bare, but remains of early imperial and republican work, such as roads, foundations, and drains. Especially interesting were the unmistakable traces of a wall made of blocks of tufa, exactly like those used in the fortifications still extant on the adjoining slopes of the Quirinal. These were, no doubt, the remains of the fortifications which we know, from Livy, to have been built in the fourth century B.C. on the retreat of the Gauls. This was decisive proof that long before the column was put up the valley between the Quirinal and the Capitol had been practically a level plain, with no hill at all upon it. Bearing in mind the important facts thus discovered, Signor Boni turned his attention again to the interpretation of the inscription, and showed that it did not, as had been supposed, refer to the altitude of a hill which it had been necessary to remove, but to the height and noble proportions of the buildings that had been erected, not only on the level of the Forum Ulpium, but also on the slope of the neighbouring hill. It was to afford a view over the forum and these buildings that the spiral staircase had been constructed inside the column, and standing place arranged at its summit, where stood the bronze statue of the emperor. The base of the statue was a *torus*—a large round moulding decorated with beautiful carvings, in the form of a gigantic wreath of laurel 20 feet in diameter. A violent blow had chipped off a large section of this *torus*, and this Commendatore Boni believes to have been occasioned by the falling down of the statue in early mediæval times, when bronzes of this kind, which stood on the summits of the arches, and other monuments of Rome, were taken down either to be carried to Constantinople, or to be transformed into church bells. The lecturer exhibited a photograph taken vertically from the summit of the column. This showed how it had fallen down, and what was the result of the fall which had caused the blow received by the statue. He also explained how he had succeeded in finding the missing fragments buried near the pedestal. These, including a fragment 10 feet long, were restored to the statue in their original position, whence they had been missing for at least twelve or thirteen centuries.

It is stated that Commendatore Boni during his visit to Cambridge was to discuss with Professor Waldstein the best means of carrying out the scheme for the excavation of Herculanæum, and that they were to be assisted by the expert opinion of Professor T. McKenny Hughes, who has made a special study of the geological stratification of Herculanæum, and will be able to advise as to the best methods of boring, tunnelling, &c. It is understood that Commendatore Boni has promised that Professor Waldstein's proposals for the excavations shall be brought before the Central Committee, whose duty it is to advise the Italian Government on such matters.

Obituary.

DAVID JENKINS, of Llandilo, Carmarthenshire, whose death is announced, was elected *Associate* 1888, and *Fellow* 1894. Mr. Jenkins had an extensive practice in South Wales. A list of his principal works is given in *The Builder* for 18th May.

WILLIAM HEWSON LEES, *Associate*, elected 1865, died 7th May in his sixty-fourth year. Mr. Lees was formerly district surveyer for S.E. Deptford, and subsequently for Holborn, E. Strand, and part of St. Pancras. He had recently resigned the latter appointment. Mr. Lees carried out the extension in Berkeley Street and the improvement of the Berkeley Hotel, Piccadilly.

GEORGE SAUNDERS, who died on the 21st May in his seventy-eighth year, had been for fifty-one years a member of the Institute, joining as *Associate* in 1856 and proceeding to the *Fellowship* in 1869. He was the architect of St. Nicholas' Parish Hall, Chiswick, and of various public elementary schools in the neighbourhood of Chiswick.

WALTER WOOD ROBERTSON, F.S.A. Scot., whose death is announced, had only recently joined the Institute, having been elected *Fellow* last December. Mr. Robertson was articled to the late John Chesser, of Edinburgh, in 1858, and was subsequently in the offices respectively of Messrs. John Holden & Son and Messrs. Speakman & Charlesworth, of Manchester. He was afterwards for six years technical clerk in H.M. Office of Works, London, and in 1877 was appointed Principal Architect and Surveyor for Scotland under H.M. Office of Works. Mr. Robertson resigned this appointment about three years ago and started in private practice. In his official capacity he carried out numerous Government buildings in Scotland, including the Royal Observatory Edinburgh, Post Offices at Glasgow, Dundee, Paisley, Inverness, Perth, Greenock, &c. He was architect of the memorial erected in Dunfermline Abbey to the Scottish soldiers who fell in the recent South African War.

SIR BENJAMIN BAKER, K.C.B., K.C.M.G., F.R.S., LL.D., the gifted engineer, designer and constructor of the Forth Bridge, died on the 19th May at the age of sixty-six. Sir Benjamin was elected *Hon. Associate* in 1896. On the only occasion on which he spoke at the Institute—viz., at the opening meeting of the Session 1904-05—he excused himself for not talking Science on that occasion; he had been married to Science, he said, since boyhood, but his real love was Art.

THE Council, at the request of the Organising Committee of the Letchworth Housing Exhibition to nominate a judge for the Exhibition, have nominated Mr. E. Guy Dawber [*F.*].

THE Council have instructed the Secretary of the Institute to attend the meeting of the Permanent Committee of the International Congresses of Architects to be held in Paris on 1st June.

THE Council have appointed Messrs. T. W. Cutler [*F.*] and J. Osborne Smith [*F.*] to represent the Institute on the General Committee of the Second International Congress on School Hygiene, to be held in London from the 5th to the 10th August next. As already stated in these columns, the President R.I.B.A., Mr. T. E. Collcutt, will preside over the section devoted to School Buildings and their Equipment, and Sir Aston Webb, R.A. [*F.*], is to open a discussion on the Lighting and Ventilating of Class-rooms.

MINUTES. XIV.

At the Fourteenth General Meeting (Ordinary) of the Session 1906–07, held Monday, 27th May 1907, at 8 p.m.—Present: Mr. Thomas E. Collcutt, *President*, in the Chair; 27 Fellows (including 10 members of the Council), 30 Associates (including 1 member of the Council), and numerous visitors—the Minutes of the Annual General Meeting held Monday, 6th May 1907 [p. 484], were taken as read and signed as correct.

The following Fellows attending for the first time since their election were formally admitted by the Chairman—viz., John Dixon Butler and William James Kemp.

The Hon. Secretary announced the decease of the following members—viz., David Jenkins [*F.*], William Hewson Lees [*A.*], George Saunders [*F.*], Walter Wood Robertson [*F.*], Sir Benjamin Baker [*H.A.*].

Sir Henry Tanner, I.S.O. [*F.*], Chairman of the Joint Reinforced Concrete Committee, formally presented the Provisional Report of the Committee, which had previously been circulated among members, and moved that the Report be adopted, and that copies thereof, with explanatory letters, be sent to the Local Government Board and the London County Council.

The motion having been seconded by Mr. John Slater [*F.*], in the discussion which ensued some slight typographical errors were drawn attention to, and the accuracy of some of the equations was questioned by Mr. E. Fiander Etchells, F.Ph.S., visitor.

Points raised by other speakers were dealt with by members of the Joint Committee present, and finally the motion was put from the Chair and unanimously adopted, subject to such revision of the Report as the Committee may consider necessary after consideration of the criticism above referred to.

A vote of thanks to the members of the Committee for their labours in connection with the Report was put from the Chair and carried by acclamation.

The proceedings then closed, and the Meeting separated at 9.40 p.m.

SPECIAL GENERAL MEETING.

At a Special General Meeting summoned by the Council under By-law 60 in accordance with the requisition of members, and held Tuesday, 28th May, at 8 p.m.—Present: Mr. Thomas E. Collcutt, *President*, in the Chair; 59 Fellows (including 10 members of the Council) and 48 Associates (including 1 member of the Council), the Minutes of the Ordinary Meeting held the previous evening [*see above*] were read and confirmed.

The President announced that the Meeting had been called in compliance with the requisition of Messrs. James S. Gibson [*F.*], H. V. Lanchester [*F.*], E. A. Rickards [*F.*], W. G. Wilson [*F.*], Alfred W. S. Cross [*F.*], C. E. Mallows [*F.*], Herbert Read [*F.*], R. Falconer MacDonald [*F.*], Herbert W. Wills [*A.*], C. E. Hutchinson [*A.*], John Anderson [*A.*], and J. R. Best [*A.*], for the following purposes, which were duly set out in the notice-paper convening the Meeting—viz.: *A.* To consider the conditions and instructions issued by the London County Council governing the competition for a new County Hall (and any replies to competitors forming part of such conditions). *B.* To consider any action taken by the Institute Council with reference to the initiation, conduct, conditions, and instructions of the competition. *C.* To propose any resolutions which may arise out of the subjects or matters dealt with under Clauses *A* and *B*.

Mr. James S. Gibson [*F.*] read some remarks giving details of the scheme of the County Hall Competition as set out in the Instructions issued by the London County Council, and, having briefly recapitulated the recommendations made by the Council of the Institute to the London County Council in connection with the competition, went on to argue that the County Council Instructions differed from those recommendations in certain essential points, and, further, that such Instructions were in direct violation of clause 3 of the Institute "Regulations for the Conduct of Competitions" in so far as they provided for the official architect of the County Council acting as Assessor in the Competition and also conjointly with the successful architect in carrying out portions of the work.

At the request of Mr. George Hubbard, F.S.A. [*F.*], the President directed correspondence to be read which had recently passed between the Institute Council and the London County Council—viz. (1) a letter from the Institute Council, dated 26th March, urging amendment of Instructions 8 and 9 with a view to appointing the successful competitor as sole architect and the L.C.C. official architect as consulting architect; (2) the County Council's reply, dated 14th May, declining to alter the Instructions.

A discussion ensued as to the precise relationship the Instructions intended should exist between the L.C.C. official architect and the architect whose design was to be carried out.

Mr. J. S. Gibson moved that a notice be immediately published in the JOURNAL and the professional papers stating that until the conditions and instructions governing the competition for a new County Hall for London were brought into uniformity with the Regulations of the Institute all members were prohibited from taking any part in such competition; and that a copy of the Resolution should be sent to the Clerk to the London County Council.

An objection by Professor Beresford Pite [*F.*] and others that such resolution could not be brought forward without due notice was overruled by the President.

The resolution having been seconded by Mr. Herbert W. Wills [*A.*] and discussed, Mr. W. E. Riley [*F.*], official architect of the London County Council, addressed the Meeting, contending that there was nothing in the Instructions to warrant the assertion that he was to act as joint-architect of the building, and stating that it was not the intention of the County Council that he should occupy that position.

In further discussion, suggestions for the withdrawal of the motion were made, but, not being accepted, the motion was ultimately put from the Chair, and upon a show of hands declared defeated—29 voting for and 50 against it.

The proceedings then closed, and the Meeting separated at 10.30 p.m.